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Kyung Woon Kim

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EXAMINER

TAI, XIUYU

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/538,388	Applicant(s) KIM ET AL.	
	Examiner Xiuyu Tai	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-30 and 32 is/are pending in the application.
- 4a) Of the above claim(s) 9-12, 14-19, 21, 23, 25 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-8, 13, 20, 22, 25, 27-30, 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 1/4/2010 have been fully considered but they are not persuasive.

2. Due to applicant's amendments to claims 13 and 20, the rejections to claims 13 and 20 under 35 U.S.C. 112 second paragraph are withdrawn.

3. In response to the arguments regarding "a shoulder" cited in claim 5,
(i) applicants argued that the instant specification defines "a shoulder" as a circular step formed by a change of an inner diameter of the coupling hole (see page 9 of REMARKS). However, this definition includes additional structural limitations that are not recited in claim 5. Furthermore, the prior art cited by the applicants (see page 9 of REMARKS), referring that the term "shoulder" is commonly used in the art, are not related to the teaching of plasma reactor; thus, the term "shoulder" is not conventionally known in the art of plasma reactor.

(ii) it is noted that the features upon which applicant relies (i.e., "a shoulder" as a circular step formed by a change of an inner diameter of the coupling hole) are not recited in the rejected claim 5. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

(iii) applicants' arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without

Art Unit: 1795

specifically pointing out how the language of the claims patentably distinguishes them from the references.

4. In response to the arguments regarding “an electric connecting part” and “a non-electric connecting part” cited in claim 7,

(i) applicants argued that the instant specification defines “an electric-connecting part” as a part positioned in the electric connecting coupling hole of the electrode and “a non-electric connecting part” as a part positioned in the non-electric connecting coupling hole (see page 10 of REMARKS). However, these definitions include additional structural limitations that are not recited in claim 7.

(ii) it is noted that the features upon which applicant relies (i.e., “an electric-connecting part” as a part positioned in the electric connecting coupling hole of the electrode and “a non-electric connecting part” as a part positioned in the non-electric connecting coupling hole) are not recited in the rejected claim 7. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

(iii) applicants’ arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Response to Amendment

5. The amendment filed 1/4/2010 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

the amended claim 13 recites limitation of “ the first dielectric sheet plate has a small diameter electric connecting coupling hole ... and a first small diameter non-electric connecting coupling hole” line 5-6. “a small diameter” and “a first small diameter” in claim 13 are referred to different diameters. However, the instant specification (page 9 line 6-13) describes that the first dielectric sheet plate 10 has “an electric connecting coupling hole 12 with a small diameter and a non electric connecting coupling hole 14 with a small diameter” and the second dielectric sheet plate has “a non electric connecting coupling hole 24 with a small diameter” . Figure1 clearly shows that holes 12, 14 and 24 are the same size (i.e. a small diameter) while the hole 22 is a large diameter. Therefore, the amended claim 13 is not supported by the original disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 5-8, 13, 20, 22, 25, and 27-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 1795

7. Claim 5 recites limitation “a shoulder”. The instant specification does not define this term clearly and the term is not conventionally known in the art. Therefore, appropriate correction/clarification is required. It appears that “a shoulder” is a part of a hole that connects with the electrode via a neck part (page 10 line 2-5). In the light of the instant specification, “a shoulder” will be interpreted as a part of a hole that connects with an electrode. Because of their dependency, claims 6-8, 13, 20, 22, 25, and 27- 30 are rejected.

8. Claim 7 recites limitations “an electric connecting part” and “a non-electric connects part”. The instant specification does not define this term clearly and the term is not conventionally known in the art. Therefore, appropriate correction/clarification is required. In the light of the instant specification (page 15, line 24-27), “an electric connecting part” is interpreted as a part of coupler element that is in contact with electrode in the electric connecting coupling hole while “a non electric connecting part” is interpreted as a part of coupler element that is NOT in contact with electrode in the non electric connecting coupling hole.

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claim 13 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

Art Unit: 1795

skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

11. The amended claim 13 recites limitation of “the first dielectric sheet plate has a small diameter electric connecting coupling hole ... and a first small diameter non-electric connecting coupling hole” in line 5-6. “a small diameter” and “a first small diameter” in claim 13 are recited as different diameters. However, the instant specification (page 9 line 6-13) describes that the first dielectric sheet plate 10 has “an electric connecting coupling hole 12 with a small diameter and a non electric connecting coupling hole 14 with a small diameter” and the second dielectric sheet plate has “a non electric connecting coupling hole 24 with a small diameter”. Figure 1 clearly shows that holes 12, 14 and 24 are the same size (i.e. a small diameter) while the hole 22 is a large diameter. Therefore, the amended claim 13 is not supported by the original disclosure. Appropriate correction is required. For the purpose of examination, “a small diameter”, “a first diameter” and “a second small diameter” are treated as the same size in diameter in light of the instant specification.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 5, 20, 22, 25, 27, 28, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al (US PG-PUB. 2002/0174938).

Art Unit: 1795

14. Regarding claim 5, Li et al disclose a non thermal plasma reactor (ABSTRACT).

The plasma reactor is a laminated embedded-conductor multi-cell non-thermal plasma reactor (Figure 22; paragraph [0110]). Each cell comprises: (1) ceramic plate pairs 144 (i.e. a dielectric member, Figure 16, paragraph [0108]); (2) an electrode 126 sandwiched between ceramic plates 144 (Figure 16, paragraph [0108]); (3) two sets of vias 1110 on ceramic plate 100, wherein one set is connected to the electrode 126 (i.e. electric connecting coupling hole on one side) and the other set is separated from the electrode 126 and located on the opposing side the ceramic plate (i.e. non-electric connecting coupling hole on the other side, element 110 in Figure 5, paragraph [0101]); and (4) the vias 110 connected to the electrode 126 through a conductive lead 127 (i.e. a shoulder, Figure 5, paragraph [0101]). The multi-cell is prepared by stacking a plurality of laminated cell 148 with spacers 146 (i.e. spacer) forming gas passages 162 (i.e. gap) and bus lines 161/163 (electric conductive coupler) are established through vias 110 interconnecting alternatively (Figure 22, paragraph [0110]). The bus lines 161/163 are in contact with vias 110 for interconnecting the laminated electrode (paragraph [0110]). Plasma is generated between adjacent cell by applying power through bus lines 161/163 to electrode 148 (paragraph [0110]).

15. Regarding claim 20, the vias 110 on the ceramic plate pairs forms a circular step (Figure 16).

16. Regarding claim 22, as shown in Figures 14 &15, the bus lines 161/163 are inserted through vias 110 and through holes on spacers 146 (paragraph [0107]).

Art Unit: 1795

17. Regarding claim 25, inked via cover pad 130 is provided between the vias 110 to connect the electrode 124 (Figure 5, paragraph [0103]).

18. Regarding claim 27, the electrode 126 has a via section 110 (i.e. hole surrounding part), a main electrode portion 124 (i.e. a discharging part), and a terminal lead 127 (i.e. neck part) that is narrower and connects between the vias 110 and electrode part 124 (Figure 5, paragraph [0101]).

19. Regarding claim 28, the reference teaches that one or more layers of ceramic tape 100 can be laminated and the ceramic material can be glass ceramic that is a porosity reduction material (paragraph [0099]).

20. Regarding claim 32, the electrode 124 is connected to the via 110 through conductive leads 127 (Figure 5, paragraph [0101]) and bus lines 161/163 (electric conductive coupler) are established through vias 110 interconnecting alternatively (Figure 22, paragraph [0110]).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1795

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

23. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

24. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 5 above, and further in view of Shiloh et al (U.S. 6,245,299)

25. Regarding claim 6, Li does not teach that the bus lines 161/163 comprise a plurality of coupler elements. However, Shiloh et al disclose a DBD modular for plasma device. The modular DBD device 10 comprises a plurality of cells 12 (Figure 1, col. 3, line 26-27) and each cell is joined by threaded element 32/36 (Figure 3, col. 7, line 3-5). The joined element is threaded into an integrated part. Shiloh indicates that the utilizing threaded joining element can easily change the gas width of the cell, hence adjust the performance of the modular accordingly (col. 5, line 2-3). Therefore, it would be obvious for one having ordinary skill in the art to utilize the threaded joining element as suggested by Shiloh in order to easily change the gap of the plasma reactor of Li.

Art Unit: 1795

26. Regarding claim 7, the joined element of Shiloh comprises: (1) an upper part 32(i.e. an electric connecting part) that is in contact with electrode and has a threaded hole where the threaded rod 36 is inserted (Figure 3, col. 5, line 1-10); (2) the upper part of threaded rod 36 that is not contact with the electrode (i.e. a non electric connecting part); and (3) the lower part of the threaded rod 36 (i.e. a joining part) inserted into the threaded hole 34 to join two electrode plates 14j and 16j (Figure 3; col. 5, line 3-10).

27. Regarding claim 8, the upper part of threaded rod 36 of Shiloh is between the threaded upper part 32 and the lower part of the threaded rod 36 (Figure 3; col. 5, line 3-10). The threaded upper part 32 has bigger outer diameter the threaded rod 36 (Figure 3). The upper part and the lower part of threaded rod 36 appears have the same size in outer diameter. The threaded upper part 32 has a shoulder part (Figure 3). The threaded rod 36 has matching thread for threaded upper part 32 and the threaded lower part 34 (Figure 3 col. 5, line 5-10).

28. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 5 above, and further in view of Morita et al (U.S. 6,039,816)

29. Regarding claim 13, Li teaches each electrode plate having two ceramic plate pairs 144 (i.e. a first dielectric plate and a second dielectric plate, Figures 5 & 13, paragraph [0101] & [0106]) with electrode 126 on one ceramic plate (Figure 13 & 16, paragraph [0106]). Two sets of vias 110 are provided on both ceramic plates 144 (i.e. holes on both dielectric plates, Figures 5 & 13, paragraph [0101] & [0106]) and the vias 110 on each ceramic plate appear the same size (i.e. holes on the first dielectric plate

Art Unit: 1795

with a small diameter). Vias 110 on both ceramic plates are aligned (i.e. vias arranged in line Figure 13 & 22, paragraph [0107]), but the reference does not teach that the vias 110 on one of the ceramic plates have different sizes. Morita et al disclose an ozonizer for applying corona discharge. The ozonier element 60 contains dielectric layers 62/64, discharge electrode 68, induction electrode 66 (Figure 2a; col. 8, line 22-25), and different sizes of terminals 66a (a small size) and terminal 68a (a large size terminal) connected to a power supply (Figure 2b; col. 8, line 38-40). Morita also indicates that the ozonizer with such arrangement results in continuous generation of discharge (col. 1, line 8-10). Therefore, it would be obvious for one having ordinary skill in the art to utilize a plasma reactor with vias having different sizes as suggested by Morita in order to efficiently and continuously generated discharge in the plasma reactor of Li. As a result,

30. Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US PG-PUB. 2002/0174938) as applied to claim 28 above.

31. Regarding claim 29, one ceramic plate is inked with electrode while the other matching ceramic plate is free of any main electrode paint (Figure 13 & 16, paragraph [0106]). It should be noted that the claim contains product (electrode plate) by process (bonding) language. Bonding method does not impart any unexpected significant properties of electrode to the plasma reactor. Therefore, the claimed product produced from boning method appears to have similar characteristics as the disclosed product. Because of the nature of product-by-process claims, the Examiner cannot ordinarily focus on the precise difference between the claimed product and the disclosed product.

Art Unit: 1795

It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289,292-293 (CAFC 1983).

32. Regarding claim 30, the claim contains product (electrode plate) by process (bonding) language. Bonding method does not impart any unexpected significant properties of electrode to the plasma reactor. Therefore, the claimed product produced from bonding method appears to have similar characteristics as the disclosed product. Because of the nature of product-by-process claims, the Examiner cannot ordinarily focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See *In re Marosi*, 218 USPQ 289,292-293 (CAFC 1983).

Conclusion

33. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1795

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855.

The examiner can normally be reached on Monday - Friday, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795